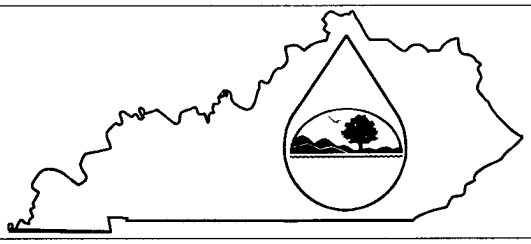
AI# 15129

KPDES FORM HQAA



Kentucky Pollutant Discharge Elimination System (KPDES)

High Quality Water Alternative Analysis

The Antidegradation Implementation Procedures outlined in 401 KAR 5:030, Section 1(3)(b)5 allows an applicant who does not accept the effluent limitations required by subparagraphs 2 and 3 of 5:030, Section 1(2)(b) to demonstrate to the satisfaction of the Environmental and Public Protection Cabinet that no technologically or economically feasible alternatives exist and that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the water is located. The approval of a POTW's regional facility plan pursuant to 401 KAR 5:006 shall demonstrate compliance with the alternatives analysis and socioeconomic demonstration for a regional facility. This demonstration shall also include this completed form and copies of any engineering reports, economic feasibility studies, or other supporting documentation

I. Permit Information

Facility Name:	Cambrian Coal Corporation	**KPDES NO.:**	898-0620 AM4 KYG-045319
Address:	P.O. Box 100	**County:**	Pike
City, State, Zip Code:	Belcher, KY 41513	**Receiving Water Name:**	Peyton Branch

II. Alternatives Analysis - For each alternative below, discuss what options were considered and state why these options were not considered feasible.

1. **Discharge to other treatment facilities.** Indicate which treatment works have been considered and provide the reason why discharge to these works is not feasible.

   The nearest municipal sewage treatment facility is the Pikeville Wastewater Treatment facility which is approximately 6.5 miles away. This plant was not designed for, or capable of, effectively treating either the type or volume of water possible with this project. Influx of water from this project would likely overload this facility resulting in a by-pass, which would lead to the discharge of untreated municipal wastes, creating a serious public health threat.

   Because of terrain, routing of water to this plant would require more than 34,000 feet (6.5 miles) of carrier line and an extensive network of pump and lift stations and obtaining numerous right-of-ways and easements. Conservatively estimating line @$22/ft, a minimum of 2 lift stations per mile, a central collection system, ignoring other stated requirements, the minimum cost of this operation would greatly exceed $2 million dollars.

   Transporting this volume of water by self-contained disposal trucks would be excessively expensive. Based on a 25 year, 24 hour storm event calculation, the possible peak discharge from this project could exceed 380 mgpd. Rates quoted from Somerset Environmental in Somerset, Kentucky indicated charges of $65/hour (gate to gate)/3,000 gallon pick-up of non-hazardous wastewater and a $0.49/gallon disposal fee.

2. **Use of other discharge locations.** Indicate what other discharge locations have been evaluated and the reasons why these locations are not feasible.

   Locations in Slones Branch, Bevin's Branch, Damron Fork, and Wolfpen Fork were evaluated as alternate discharge locations. These locations are currently occupied or are slate to be occupied by fill areas from the surrounding mining operations. Discharging this additional volume into these areas would compromise the integrity of the receiving stream(s).

   Discharging directly into the Levisa Fork was considered as an option. To route the discharge to the Levisa Fork would require a central collection system, more than 5000 feet of line, a series of lift stations and

acquiring additional leases and right of ways. The anticipated cost of this option would exceed $1 million dollars. Extensive care would need to be exercised to prevent excessive siltation of Peyton Branch from the construction for this option.

Placement and design of current discharge locations were engineered to be the most effective and least invasive. Excavation, installation and involved construction for facilities required for alternate locations would create a greater environmental disturbance than the proposed discharge locations with the same end results of discharging into comparable quality water resources.

*Lift stations are site specific and vary greatly but are specific to topography and substrate composition:

Estimation of Cost of Lift Stations
***Table 1**
Pressure (LPS)

Pumping Stations (No. per mile by topography)	*Flat*	*Rolling*	*Steep*
200 gpm P.S. $54,000	0	0	2
100 gpm P.S. $43,200	0	1	2
Composite Cost	$0	$43,200	$194,400

Gravity

Pumping Stations (No. per mile by topography)	*Flat*	*Rolling*	*Steep*
200 gpm P.S. $54,000	1	0	2
100 gpm P.S. $43,200	2	1	2
Composite Cost	$140,400	$43,200	$194,400

A Mathematical Model For Estimating Sewer Costs"
by George A. Earle, III, P.E. and R. Paul Farrell Jr., P.E., Environment One Corporation

3. **Water reuse or recycle.** Provide information about opportunities for water reuse or recycle at this facility. If water reuse or recycle is not a feasible alternative at this facility, please indicate the reasons why.

The drainage area for this area is 170.2 acres resulting in a possible peak discharge of 263,912 gpm. In order to reuse or recycle this water, a central collection system would have to be constructed which would cost near $1 million dollars. This is uneconomical since the water cannot be used at this site.

Discharge	Type	Drainage Area, Acres
SS #27	Embankment	80.1
SS #28	Embankment	63.6
SS #29	Dug Out	4.25
SS #30	Dug Out	12.8
SS #31	Dug Out	9.45
Total Drainage Area		**170.2**

4. **Alternative process or treatment options.** Indicate what process or treatment options have been evaluated and provide the reasons they were not considered feasible.

As an alternative treatment option, sand filtration was evaluated, but deemed not applicable. Sand filtration is used primarily as a pre-treatment to remove microbial contaminates, not particulate matter, in storm run-off in smaller, urban drainage areas. The high solids involved in a storm event could possibly clog the filtration unit rendering it ineffective. Sand filters do not control storm water flow and do not prevent downstream bank and channel erosions as proposed sediment structures are designed to do. Also, the operational effectiveness of these units in colder climates and freezing conditions are not yet know. Studies indicate a treatment cost of **$12 per cubic foot volume*** for this type of treatment.

Using silt fences and straw bales for sediment control was considered as per BMP's but were determined to be inadequate due to the elevation, grade of the area, and drainage area size.

**The Cost and Effectiveness of Stormwater Management Practices, Minnesota Department of Transportation, June 2005*

Constructing an on-site storm water treatment facility was considered. The volume of discharge and the lift required make this an unfeasible option. Consultation with Beckman Environmental in Cincinnati, Ohio, a company specializing in these types of constructions, revealed a recent bid on a project in Columbus, Ohio involving a lift of 30 feet, a peak discharge of 3800 gpm, a grit removal station, and influent and effluent lines at $2.5 million dollars. Using this scenario, treatment would exceed **$650/gallon volume**

Comparatively, an industry estimate for construction of a medium capacity embankment pond is approximately **$40,000** while construction of a dug out bench pond is estimated at roughly **$7,500**.

In addition to the alternates discussed above, Cambrian Coal Corporation also considered available, feasible, alternate mining locations and mining methodologies.

The presence of coal bearing deposits within the strata determines the physical location and extent of a reserve body. Geologic exploration of the reserve body indicates the site under consideration for the proposed operation is the most appropriate and practicable location based on the applicant(s) current mineral rights, workforce, equipment, infrastructure location, and long-term planning.

As an alternate process, the coal seams within the proposed permit area were analyzed for underground mining potential. Historical data from past mining operations in these and adjacent seams was used for mining recovery calculations.

For underground mining to be practicable each seam must meet the following:

- Total seam height no less than 30 inches;
- Recovery of $\geq$ 2.0 clean tons per liner foot of coal mined[1];
- Maximum single in seam parting $\leq$ 24 inches;
- 50% areal recovery for continuous miner sections;
- Minimum of 40 feet interburden between minable seams (30 feet if strata contains a competent sandstone member);
- Minimum wash recovery of 35% for 'run of mine' coals.

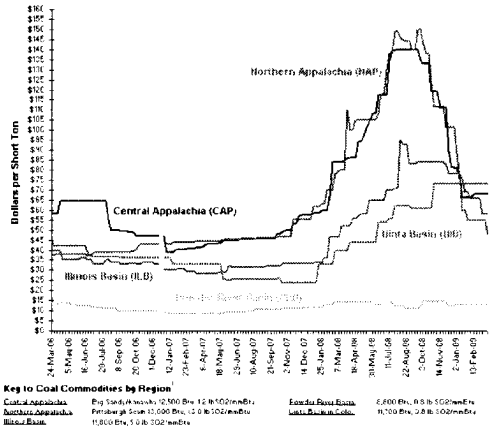
Underground Mining Criteria

Coal Seam	Seam Height > 30"	≥ 2.0 Clean Tons per Foot	Parting Thickness < 24"	50% Recovery C/Miner	Min. 40' to Mineable Seam Above
Elkhorn No. 1 and 2	Yes	Yes	No	No	No
Elkhorn No. 3	No	No	Yes	No	No
Elkhorn No. 3 ½	Yes	Yes	No	No	Yes
Elkhorn No. 3 ½ Rider	No	No	No	No	Yes
Whitesburg	No	No	Yes	No	Yes
Fireclay	No	No	Yes	No	Yes

Although the reserve analysis indicates some of the standard requirements for deep mining are met, in order to meet the requirements by landowners to maximum recovery of resources and minimize the possibility of re-mining, the applicant proposes to recover the reserves by surface area, contour, and auger methods.

Using both surface and underground data from the OMSL's annual report for Pike County for 2006, analysis indicates the average surface recovery is 35.35 tons/person/day while underground mining yields 24.23 tons/person/day. Fifty five employees are anticipated to be employed by this project. Using surface mining techniques, the estimated monthly production from this project is 50,550 tons while underground techniques would produce 34,649 tons.

Weekly Price Survey*, Spot Market



**Platts Coal Outlook*

The average price per ton for Central Appalachian coal on the spot market for February and March 2009 was $68/ton. Based on the above production estimates, surface mining techniques yields an annual increase in production, increase in gross sales dollars and an increase in severance tax dollars as well as expediting the life of the project by contemporaneous recovery and reclamation.

Surface Mining vs. Underground Mining Methodology

Mining Method	**Estimated Production/person/day**	**Estimated Monthly Production**	**Estimated Annual Production***	**Estimated Annual Gross Sales**	**Estimated Annual Severance Tax from Sales**
Surface	35.35	50,550	606,600	$41,248,800	$1,856,196
Underground	24.23	34,649	415,787	$28,273,516	$1,272,308
Difference	***11.12***	***15,901***	***190,813***	***$12,975,284***	***$583,888***

5. **On-site or subsurface disposal options.** Discuss the potential for on-site or subsurface disposal. If these options are not feasible, then please indicate the reasons why.

On site disposal was considered as a disposal option. The construction of an on-site wastewater treatment type plant would require a facility engineered to handle over 263,912 gpm during a 24 hour, 25 year storm event.* Construction cost for package plants are engineered to specific location, load and other conditions but with a required collection system would be expected to exceed $1 million dollars. These plants require a continual power source, daily maintenance, periodic repair and leave a large footprint. After completion of this project, the plant would either have to be removed or abandoned to unsightly, dangerous rubbish.

**The Rational equation is the simplest method to determine peak discharge from drainage basin runoff. It is not as sophisticated as the SCS TR-55 method, but is the most common method used for sizing sewer systems.*

The installation of a sanitary septic system, i.e., septic tank was evaluated but is not an applicable option. Building a system **large enough** to handle the **volume of water** would be impractical. Septic systems are design to degrade organic waste and biodegradable material over time by anaerobic digestion. While the source water would most likely contribute some organic material and some needed bacteria, this would be inadequate to decompose the sediment and would work essentially the same as a sediment structure.

Old abandoned underground works in the area were considered as a subsurface disposal option but were deemed as potentially dangerous due to the uncertainty of the condition of the remaining structures. The possibility exists that pumping water into these works could cause a "blow-out" or leakage leading to both a public safety and environmental threat.

6. **Evaluation of any other alternatives to lowering water quality.** Describe any other alternatives that were evaluated and provide the reasons why these alternatives were not feasible.

Choosing not to mine this area as an alternate to lowering water quality was evaluated but the loss of the 55 direct jobs and the resulting $2.7 million dollars in approximate collective annual salaries, the loss of as many as 165 indirect jobs as well as loss of revenues including severance tax estimated at $1.8 dollars annually would have severe negative economic consequences.

Accepting the more stringent discharge limitations was considered but because this would require more aggressive chemical treatment, the real potential for an environmental or personnel accident exist. The costs are extreme and it was dismissed. Based on information from OSMRE, the cost for chemical treatment of a mildly acidic mine drainage with an average flow of 100 gpm using caustic soda was $94,784. With a possible flow of over 380 mgpd during a rainfall event, the cost of this option would make the cost of this option prohibitive.

III. Socioeconomic Demonstration

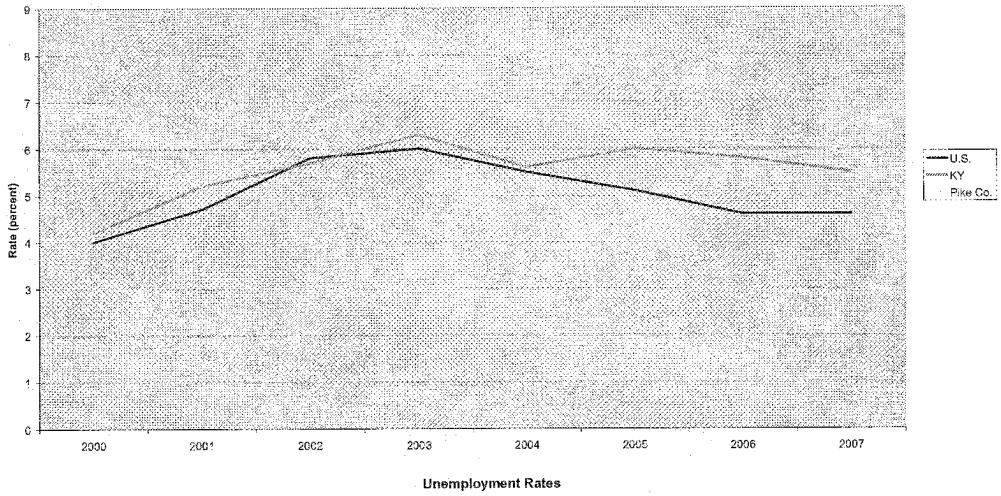
1. State the positive and beneficial effects of this facility on the existing environment or a public health problem.

   Much of the watershed to be impacted by this project is of a poor nature due to extensive, previous mining and gas lines in the area. Once mitigation begins, the stream banks will be stabilized to prevent erosion, species indigenous to the area will be planted to establish an adequate riparian zone and stream channels will be rehabilitated to curb sedimentation. This will lead to a healthier habitat for aquatic species as well as other wildlife. Reclamation plans call for development of a fish and wildlife habitat. This will provide an area ecologically functional was well as aesthetically pleasing.

2. Describe this facility's effect on the employment of the area.

   The small community of Millard historically has an unemployment rate significantly higher than state and national averages. This project will continue the employment of 55 people of which 95% are local residents. Economic impact studies suggest that the mining industry creates 3 indirect, directly related jobs for every actual direct mining position.* Based on this data, this project will support 220 total jobs. This project will aid in maintaining employment in an area which is very dependent on the coal industry for its employment and economic health.

   *Source: University of Kentucky Center for Business and Economic Research: Economic Impact Analysis of Coal in Kentucky, *(1995-2004) by Haywood and Baldwin*



3. Describe how this facility will increase or avoid the decrease of area employment.

   Unemployment data for January 2009*, indicated that there were 1,817 people in Pike County currently unemployed and seeking employment.

   By maintaining 55 existing jobs, this facility will avoid a decrease of the area's employment and also provide indirect employment for as many as 165 others providing needed jobs for this area. This is significant for Millard due to the fact the community is small and the primary jobs available in the area are generated from mining operations. This project will assure these jobs are continued. A decrease in mining activities in the area would produce the detrimental effect of more unemployed residents leading the area to greater economic distress. Although in a current upswing, the mining industry had experienced an almost 30% decrease in employment preceding 2005. These jobs help to decrease that trend.

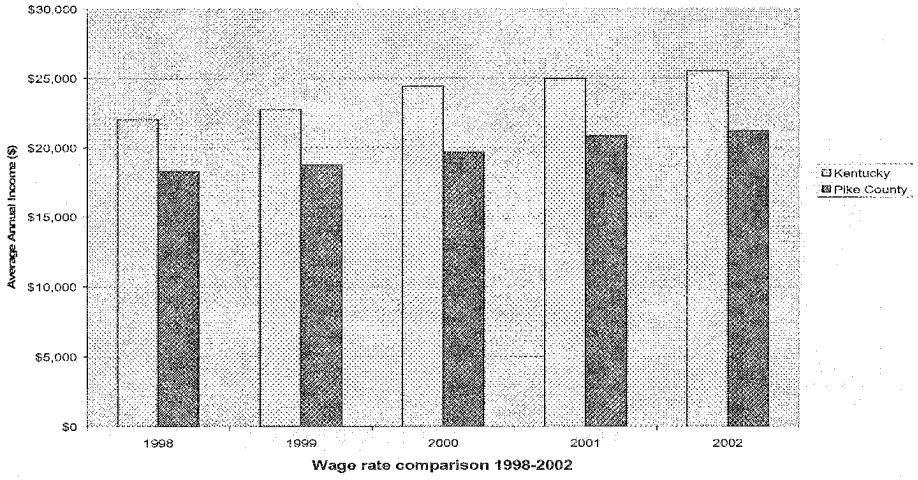
   *Workforce Kentucky

4. Describe the industrial or commercial benefits to the community, including the creation of jobs, the raising of additional revenues, the creation of new or additional tax bases.

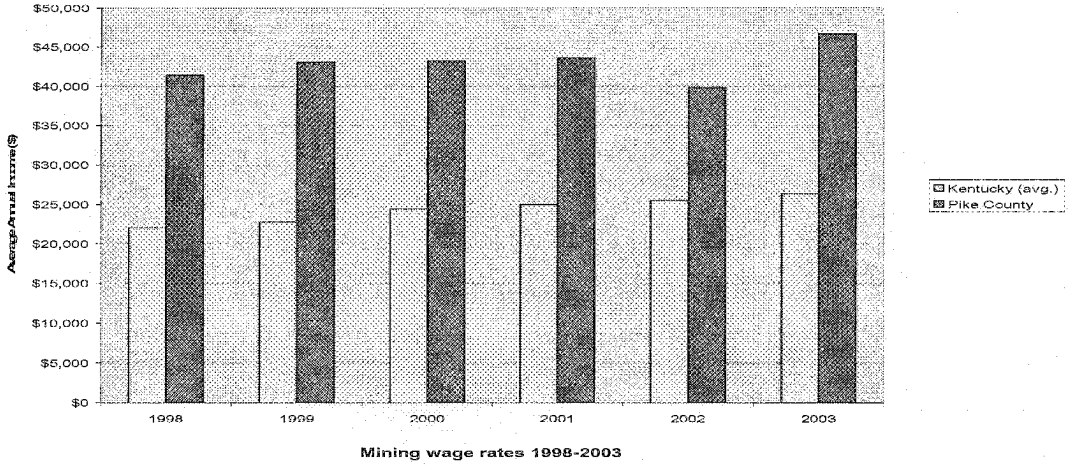
In addition to 55 direct jobs provided by this project, it will also provide for more employment indirectly in mining service jobs. These jobs include equipment sales, mining engineering consultants, food service, fuel sales, transportation, coal washing and blending. The mining industry directly contributes to Pike County's economy through real taxes, personal property taxes and the state severance tax. The severance tax rate for coal is 4.5% of which 50% is slated to be returned to the county of origin. From 1993 thru 2002, Pike County received $27,834,308 in severance taxes which have been used for local education, health services, judicial services and infrastructure project. This project will contribute close to $1 million dollars to this tax base and help provide more funding for county improvements.

5. Describe any other economic or social benefits to the community.

The jobs this project provides pay some of the highest wages in the Pike County. The maintenance of these jobs will have a positive significant impact on the community's economy. Comparing the average income of a Pike county resident with that of other Kentucky residents, Pike County residents earn on the average $5,000 less per year:



During the same period, a Pike County coal miner earned almost double that of the average Kentucky worker:

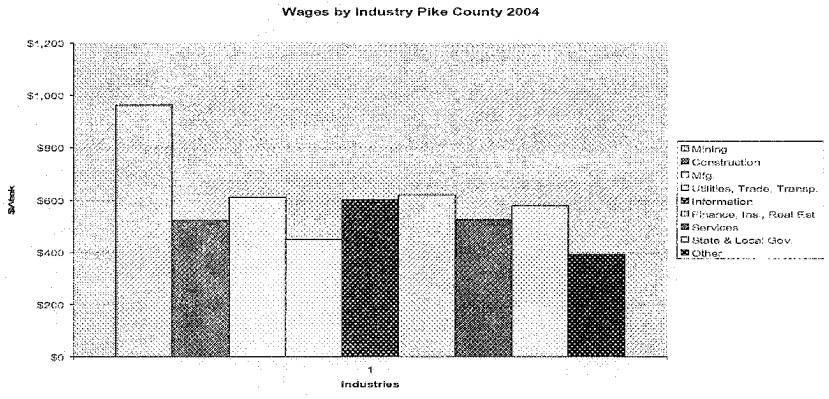


	Yes	No
6. Will this project be likely to change median household income in the county?	☒	☐
7. Will this project likely change the market value of taxable property in the county?	☒	☐
8. Will this project increase or decrease revenues in the county?	☒	☐
9. Will any public buildings be affected by this system?	☐	☒

10. How many households will be *economically* or *socially* impacted by this project? **220+**

11. How will those households be *economically* or *socially* impacted? (For example, through creation of jobs, educational opportunities, or other social or economic benefits.)

The average weekly earnings for a mining employee in Pike County in 2004 were $970.45*. These earnings accounted for 28.3% of the total county wages for that time period. The average weekly earnings in 2007 were $1126. The income realized from the direct jobs provided by this project would be over $50,000 year/household or approximately $2.75 million/year collectively. Currently Kentucky ranks 44th nationally in per capital income. The jobs provided by this project allow these households to earn more than most other occupations in Pike County including construction, manufacturing, utilities and real estate:



Data for U.S. Census indicates that in 2005, nearly 23.7% of Pike county residents were living below the poverty level. In 2000, only 9.4% of Pike County residents held a bachelors or higher degree compared with 17.1% of other Kentuckians. These earnings will help these households to maintain or improve their current economic status and provide opportunities for gains in social welfare only realized from enhanced income. Severance tax dollars fund basic needs such as water and sewer projects but also fund recreational, social and cultural developments as well.

**KY Coal Facts/Wages by County*

	Yes	No
12. Does this project replace any other methods of sewage treatment to existing facilities? (If so describe how)	☐	☒

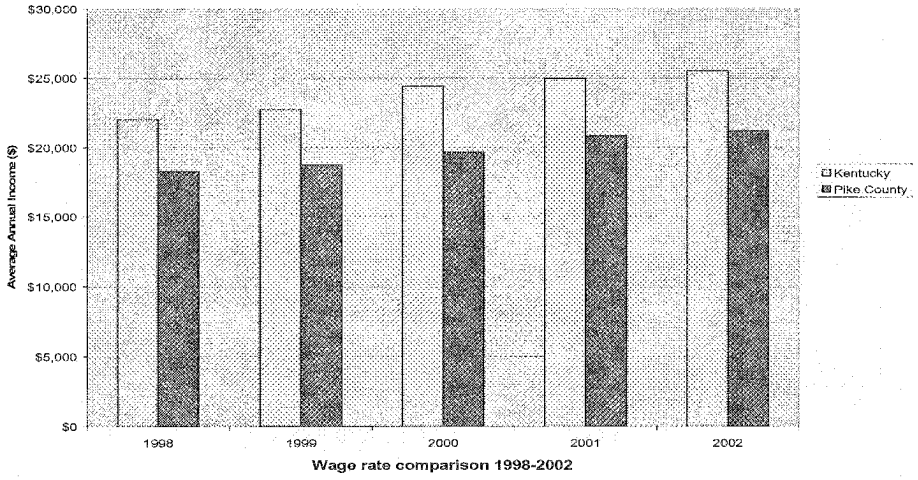
This area has historically been marked by straight line residential discharges which are gradually being replaced by septic tanks. There is no treatment taking place in the project boundary.

4. Describe the industrial or commercial benefits to the community, including the creation of jobs, the raising of additional revenues, the creation of new or additional tax bases.

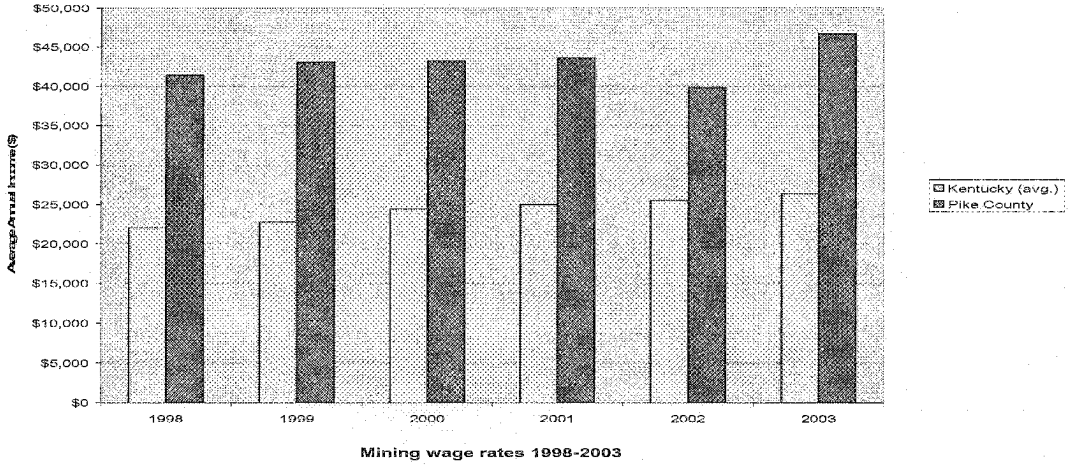
In addition to 55 direct jobs provided by this project, it will also provide for more employment indirectly in mining service jobs. These jobs include equipment sales, mining engineering consultants, food service, fuel sales, transportation, coal washing and blending. The mining industry directly contributes to Pike County's economy through real taxes, personal property taxes and the state severance tax. The severance tax rate for coal is 4.5% of which 50% is slated to be returned to the county of origin. From 1993 thru 2002, Pike County received $27,834,308 in severance taxes which have been used for local education, health services, judicial services and infrastructure project. This project will contribute close to $1 million dollars to this tax base and help provide more funding for county improvements.

5. Describe any other economic or social benefits to the community.

The jobs this project provides pay some of the highest wages in the Pike County. The maintenance of these jobs will have a positive significant impact on the community's economy. Comparing the average income of a Pike county resident with that of other Kentucky residents, Pike County residents earn on the average $5,000 less per year:



During the same period, a Pike County coal miner earned almost double that of the average Kentucky worker:



	Yes	No
13. Does this project treat any existing sources of pollution more effectively? (If so describe how.)	☒	☐

There are pre-law areas, old fill areas, trails and roads accessing gas wells and lines lacking adequate drainage control. These areas, totaling approximately 17 acres, will be rehabilitated. Implementation of this project will include proper grading and drainage to improve sediment control from these areas. Existing over growth will be removed and channelization of receiving stream due to excessive silting will be improved. Prior to the state of this project, the mine site will be cleaned and all garbage material will be disposed of.

	Yes	No
14. Does this project eliminate any other sources of discharge or pollutants? (If so describe how.)	☒	☐

This project will involve reclaiming old mine sites which are contributing to erosion and sedimentation in the area. It will also improve sediment control from run-off resulting from existing gas wells and access roads in the permit area. Reclamation for the area, including approximately 17 acres of existing disturbances, will include initial seeding for ground control and later selected native planting to establish a functional fish and wildlife habitat.

15. How will the increase in production levels positively affect the socioeconomic condition of the area?

This project will remove approximately 3 million tons of coal that would not have been recovered or made available to the market otherwise. This will result in continued employment for approximately 220 people, aid in development and maintenance of indirect jobs and will increase the amount of money the area receives in personal and severance taxes. Pike County should see the return of near $1 million dollars annually in severance tax dollars from this project alone.

16. How will the increase in operational efficiency positively affect the socioeconomic condition of the area?

Over 50% of the electricity in the United States and 98% of the electricity in Kentucky is generated from coal. In order to power our national energy needs at a reasonable cost, coal reserves must be recovered.

Cambrian is under contractual agreements to provide coal to utilities for this needed energy source. Cambrian also provides metallurgical coal for steel production both abroad and in the United States. In order to meet those contractual agreements, Cambrian must be able to mine coal in the most economical, expedient and logistical manner possible while also incorporating stringent safety and environmental standards.

Surface extraction provides the most economical means to recover these coal reserves. This mining method will allow more economical operational efficiency by allowing reclamation to be contiguous with the excavation process

The increase in operational efficiency of this facility will increase and enhance the production of this mine which helps maintain jobs directly related to this operation and jobs indirectly related.

Cambrian continually strives to maintain environmental integrity in its project areas while providing economical resources, gainful employment and community investments.

	Yes	No
13. Does this project treat any existing sources of pollution more effectively? (If so describe how.)	☒	☐

There are pre-law areas, old fill areas, trails and roads accessing gas wells and lines lacking adequate drainage control. These areas, totaling approximately 17 acres, will be rehabilitated. Implementation of this project will include proper grading and drainage to improve sediment control from these areas. Existing over growth will be removed and channelization of receiving stream due to excessive silting will be improved. Prior to the state of this project, the mine site will be cleaned and all garbage material will be disposed of.

	Yes	No
14. Does this project eliminate any other sources of discharge or pollutants? (If so describe how.)	☒	☐

This project will involve reclaiming old mine sites which are contributing to erosion and sedimentation in the area. It will also improve sediment control from run-off resulting from existing gas wells and access roads in the permit area. Reclamation for the area, including approximately 17 acres of existing disturbances, will include initial seeding for ground control and later selected native planting to establish a functional fish and wildlife habitat.

15. How will the increase in production levels positively affect the socioeconomic condition of the area?

This project will remove approximately 3 million tons of coal that would not have been recovered or made available to the market otherwise. This will result in continued employment for approximately 220 people, aid in development and maintenance of indirect jobs and will increase the amount of money the area receives in personal and severance taxes. Pike County should see the return of near $1 million dollars annually in severance tax dollars from this project alone.

16. How will the increase in operational efficiency positively affect the socioeconomic condition of the area?

Over 50% of the electricity in the United States and 98% of the electricity in Kentucky is generated from coal. In order to power our national energy needs at a reasonable cost, coal reserves must be recovered.

Cambrian is under contractual agreements to provide coal to utilities for this needed energy source. Cambrian also provides metallurgical coal for steel production both abroad and in the United States. In order to meet those contractual agreements, Cambrian must be able to mine coal in the most economical, expedient and logistical manner possible while also incorporating stringent safety and environmental standards.

Surface extraction provides the most economical means to recover these coal reserves. This mining method will allow more economical operational efficiency by allowing reclamation to be contiguous with the excavation process

The increase in operational efficiency of this facility will increase and enhance the production of this mine which helps maintain jobs directly related to this operation and jobs indirectly related.

Cambrian continually strives to maintain environmental integrity in its project areas while providing economical resources, gainful employment and community investments.